Claims

1. A transgenic rat, whose genome comprises at least one copy of a transgene encoding at least a portion of a CD4 protein sufficient for binding to gp120, wherein CD4 encoded by the transgene is expressed on PMBCs of the transgenic rat.

2. The transgenic rat of claim 1, wherein the genome further comprises a transgene encoding for at least a portion of CCR5.

3. The transgenic rat of claim 2, wherein CD4 is human CD4.

4. The transgenic rat of claim 3, wherein the human CD4 is a full length CD4 protein.

5. The transgenic rat of claim 2, wherein the encoded transgene is capable of mediating entry of HIV.

6. A cell from the transgenic rat of claim 3.

7. A cell from the transgenic rat of claim 4.

8. The cell of claim 6, which is a germ cell.

9. The cell of claim 8, which is a somatic cell.

10. The cell of claim 6, which is an egg.

11. A transgenic rat, whose genome comprises a gene encoding CXCR4 and at least one copy of a transgene encoding at least a portion of a CD4 protein sufficient for binding to gp120, wherein CXCR4 encoded by the gene and CD4 encoded by the transgene is expressed on PMBCs of the transgenic rat.

12. An assay for identifying a molecular antagonist compound, which interferes with a lentivirus ligand-CD4 receptor interaction, comprising the steps of:

(a) administrating the molecular antagonist compound to a transgenic rat of claim 1; and

(b) determining the level of interaction between the lentivirus ligand and CD4 receptor expressed on PMBCs of the transgenic rat, wherein a difference in the level of interaction between the lentivirus ligand and CD4 receptor expressed on PMBCs of the transgenic rat relative to that in a transgenic rat to which the compound was not administered indicates that the compound interferes with the lentivirus ligand and the CD4 receptor.

13. The method according to claim 12, wherein the lentivirus ligand is HIV-1 gp120.

14. A method for identifying a compound which inhibits infection of a human cell by HIV, comprising

(a) administrating a test compound to a transgenic rat of claim 3 or contacting a cell thereof with the test compound; and

(b) determining the level of IV or gene product thereof in the transgenic rat or cell thereof of step (a),

wherein a lower level of HIV or gene product thereof in the transgenic rat or cell thereof of step (a) relative to that in a transgenic rat to which the test compound was not administered or cell that was not contacted with the test compound, respectively, indicates that the test compound inhibits infection by HIV.

15. The method of claim 14, comprising determining the level of HIV by determining the level of p24.

16. The method of claim 14, comprising determining the level of one or more HIV RNAs.

17. The method of claim 14, comprising determining the level of one or more HIV proteins.

18. A method for identifying a compound which reduces infection of a human cell by HIV, comprising

(a) administrating a test compound to a transgenic rat of claim 1; and

(b) determining the presence of at least one symptom characteristic of AIDS in the transgenic rat,

wherein the reduction of at least one symptom of HIV in the transgenic rat of step (a) relative to that in a transgenic rat to which the test compound was not administered, indicates that the test compound inhibits infection by HIV.

19. A method for testing or determining the efficiency of a test vaccine against HIV, comprising administering to a transgenic rat of claim 1, a vaccine, infecting the transgenic rat with HIV, and determining the level of HIV or gene product thereof, wherein the presence of less HIV or product thereof in a rat having been administered the vaccine relative to a transgenic rat that has not received the vaccine indicates that the test vaccine is efficient.

20. An assay for identifying a test compound, which interferes with a lentivirus ligand- CD4 receptor interaction, comprising the steps of:

(a) incubating a cell of the transgenic rat of claim 3 with a lentivirus ligand and the test compound; and

(b) determining the level of interaction between the lentivirus ligand and CD4 receptor expressed on the cell of the transgenic rat, wherein a difference in the level of interaction relative to that of a cell that was not contacted with the test compound indicates that the test compound interferes with the lentivirus ligand and the CD4 receptor.

21. The method according to claim 19, wherein the lentivirus ligand is HIV-1 gp120.